Effective Clinical Decision-Making from Practice-Based Evidence

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This is an ongoing research investigating the use of health information technologies (HIT) to improve clinical decision-making processes. Effective and timely clinical decision-making can lead to positive improvements in patient's health outcome.

The primary hypothesis of this research is that a Practice-Based Evidence (PBE) approach by utilisation of Electronic Health Records (EHR), improves clinical decision-making capabilities of healthcare professionals. This study therefore looks to answer the following research questions. (1) What is the current practice by healthcare professionals when making clinical decisions? (2) What limits the ability to make well-informed clinical decisions? and (3) How EHR and PBE assisting improvements to the clinical decision-making capabilities?

Patient care has become complex and complicated, especially for patients with co-morbidities such as diabetes, hypertension or asthma. Progressively, Evidence-Based Practice (EBP) has been the key paradigm in clinical care, assisting doctors and clinicians in making informed decisions through the use of clinical evidence and individual clinical expertise. While EPB results in a safer, more consistent and more cost-effective clinical practice, EBP lacks applicability to real world clinical settings. Enquiries on EBP being "valid" and "reliable" were raised as evidences used in EBP are outcomes from systematic research such as randomised controlled trials (RCT) where considerable limitations have been highlighted. For example, strict patient selection criteria restrict the amount of data available for analysis, making it insufficient to be useful when making precise estimation of treatment effects. This same criterion may also exclude group of patients with co-morbidities, thus RCT findings are not an accurate reflection of the real world clinical scenarios. Such limitations highlight the need for a better clinical practice approach.

A proposed solution would be to use evidence with real world relevant clinical practices; a paradigm of Practice-Based Evidence (PBE). With the key being evidence drawn from practice settings, PBE becomes highly practical and relevant to existing patient conditions. EHR hence plays a pivotal role in capturing relevant and meaningful information from clinical practices. Information surrounding patients such as intervention method, treatment processes and prescriptions are continuously recorded in EHR. Such valuable information becomes "evidence" that can be used to assist healthcare professionals make effective and timely clinical decisions such as providing alternative treatment, which is recorded in EHR but not found necessarily in a clinical guideline or notes. As shown in Fig. 1, integrated data from EHR is fed as the source for decision support system, enabling the clinical decision maker with information and assistance in making relevant clinical decisions. Hence, decision support is made easily accessible and in real-time.

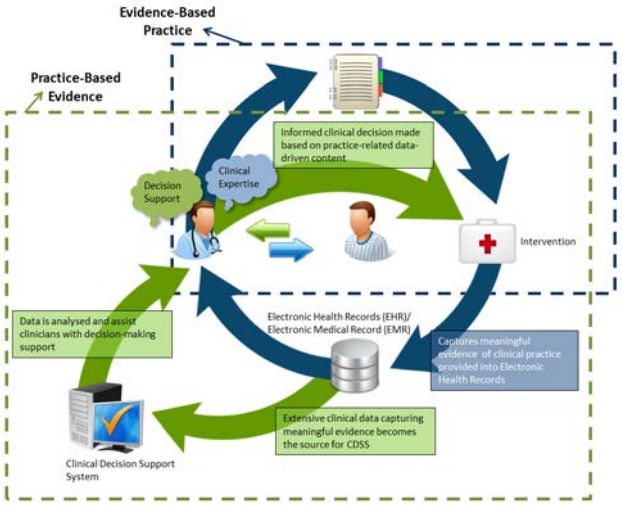

Fig. 1 Illustration on the utilisation of evidence captured meaningfully from EHR for a Practice-Based Evidence approach.

To evaluate the effectiveness of the proposed solution, comprehensive data from EHR will be collected and loaded into a data warehouse. It will be fed as a source to a decision support system to identify patients who are at risk of diabetes. This process involves the use of two datasets, one containing only patients diagnosed with diabetes and the other containing all different types of patients. By referencing to the information inherent in the diabetic datasets, patients in the second dataset who exhibit similar traits to that of a diagnosed diabetic will be alerted through the decision support system for further investigation.

While there are other examples of Practice-Based Evidence approach such as Practice-Based Research Networks, the use of past health records as "evidence" to guide clinical care is something worth exploring. As illustrated in Fig. 1, EHR can be used as a resource to improve and guide care delivery instead of providing static historical information. The evidences drawn are not only from a single patient, but from multiple patients altogether, possibly providing a holistic overview of every possible spectrum of patient conditions, treatments and interventions.